

close-set short claviform papillae. Tentacular segment with basal lobes elongated, each with 2 or 3 dark setae; two pairs of subequal tentacular cirri similar to median antenna. Dorsal cirri with bulbous cirrophores; styles extend to about the tips of the neurosetae, tapering gradually distally to slender slightly bulbous tips, with short scattered claviform papillae. Ventral cirri shorter than neuropodia, subulate, with slightly bulbous tips and few short globular papillae (Fig. 5, *b*). Pair of long anal cirri—the longest appendages of the body. Segmental papillae short, globular, inconspicuous, begin on segment 6, continuing posteriorly.

Parapodia biramous, long, slender—parapodia including setae longer than body width; notopodium a short rounded lobe with projecting finger-like acicular lobe; neuropodium conical, the apex forming a short supraacicular lobe (Fig. 5, *b*). Both notosetae and neurosetae delicate, transparent, iridescent. Notosetae form a spreading bundle of 5 or 6 rows of graded lengths, the upper row the shortest, the longest lower row extending about one-half the length of the neurosetae; they are widest basally (10 to 12.5 $\mu$  in diameter), tapering gradually to short capillary tips, appearing smooth but with numerous close-set fine spinous rows as seen under the highest magnification (Fig. 5, *c*). Few notosetae of tentacular segment rather stout (20 $\mu$  in diameter), lacking slender tips; upper notosetae of second or buccal segment curved, without slender tips. Neurosetae with long shaft of uniform width (10 to 15 $\mu$  in

diameter basally), with enlarged distal spinous regions (15 to 20 $\mu$  in greatest diameter on basal part of spinous regions), gently curved, ending in short slender tips (not capillary); supraacicular neurosetae with longer spinous regions and longer more slender tips (Fig. 5, *d*); more ventral neurosetae with shorter spinous regions (Fig. 5, *e*). Two specimens (collected November 8, 1954, New Hampshire) were filled with eggs. In life, the red ventral nerve cord and cerebral ganglion in the prostomium show conspicuously through the delicate transparent tissues of the body.

*Remarks.*—The setal, parapodial and prostomial shapes resemble those figured by Malmgren (1865, pl. 13, fig. 22) for *Nemidia torelli*. It differs by having eyes present, fewer number of segments, and more numerous notosetae.

*Locality.*—Types (U.S.N.M. nos. 26462 and 26463): Little Harbor, Newcastle, N. H., in sandy-mud burrows associated with *Nereis virens*, July 4, 1953 (1 specimen, M. Pettibone, collector); November 11, 1954 (4 specimens, G. M. Moore, collector). Also mouth of Cape Cod Bay, Mass., near Race Point Light, gray mud, 26 fathoms, 1879, Loc. 296; near Cuttyhunk Light, sand and mud, 17½ fathoms, 1880, Loc. 860—both collected by U.S. Fish Commission.

#### REFERENCE

- MALMGREN, A. J. *Nordiska Hafs-Annulater*. Förh. Öfv. Kongl. Vet. Akad. Stockholm, nos. 1, 2, 5: 51–110, 181–192. 355–410. pls. 8–15, 18–29. 1865.

MAMMALOGY.—*Descriptions of pocket gophers (Thomomys bottae) from north-eastern Arizona.* DONALD F. HOFFMEISTER, Museum of Natural History, University of Illinois, Urbana, Ill. (Communicated by David H. Johnson.)

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Pocket gophers of the species *Thomomys bottae* have recently been collected in certain parts of Arizona from which they were poorly known before. This new material, together with previously collected material, indicates the need for a re-evaluation of some kinds of gophers in northeastern Arizona. It seems desirable to recognize one new subspecies and redescribe another.

*Thomomys bottae rufidulus*, n. subsp.

*Type.*—Adult male, no. 7344, Univ. Illinois Mus. Nat. Hist., from 2 miles east of Joseph

City, Navajo County, Ariz.; collected January 1, 1953, by Donald F. Hoffmeister, original no. 1965.

*Range.*—Along parts of the Little Colorado and Puerco rivers in Arizona and New Mexico; probably between Winslow, Ariz., and Gallup, N. Mex.

*Diagnosis.*—A race of *Thomomys bottae* characterized by a reddish color intermixed with considerable black and by small size. Color in summer: back (*a*) Clay-Color or Cinnamon approaching Cinnamon-Buff (capitalized color terms from

Ridgway, *Color standards and color nomenclature*, 1912), with numerous dark hairs forming a dark stripe down back, with color paling on sides to Cinnamon-Buff; underparts whitish with a heavy wash of Pinkish Cinnamon, which is heaviest along midventral line and fading out toward lateral line. Color in winter: sides (j)14' Ochraceous-Tawny, with color on back interspersed with brown, giving dorsum a grayish appearance; underparts whitish with only the faintest indication of wash of Cinnamon. Size: small; smaller than *T. b. aureus* and *T. b. peramplus* by about seven to ten per cent; about the same size or slightly smaller than *T. b. fulvus*. Skull: small in most features but broad interorbitally.

*Comparisons.*—*Thomomys bottae rufidulus* differs from *T. b. aureus* in being less bright red, more blackish, and in smaller size. It differs from *T. b. peramplus* in being lighter in color, with a less prominent dark stripe down the back. *T. b. rufidulus* differs from *T. b. fulvus* in lighter, more reddish upper parts, lighter underparts, and shorter hind foot.

*Measurements.*—Four adult males and two adult females, all topotypes, give the following respective measurements: total length, 225, 213, 226, 226, 229, 216; tail, 63, 62, 66, 70, 77, 66; hind foot, 33, 31, 31, 34, 31, 32; ear, 6, 6, —, 7, 6, 6; basilar length, 34.7, 32.5, 34.9, 34.9, 34.3, 32.7; zygomatic breadth, 24.6, 22.0, 23.8, 23.6, 23.8, 22.7; mastoidal breadth, 21.1, 20.5, 20.8, 20.8, 20.1, 19.9; length of nasals, 13.7, 12.3, 13.6, 13.7, 13.6, 13.0; least interorbital breadth, 7.1, 6.8, 7.0, 6.7, 6.9, 6.7; length of diastema, 13.7, 12.4, 14.1, 13.8, 13.4, 12.9; length of rostrum (taken from middle of anterior border of nasals to maxilla at its lateral-most point of union with hamular process of lacrimal), 17.0, 15.6, 16.8, 17.0, 16.5, 15.8; breadth of rostrum (taken where maxillary and premaxillary bones meet on sides of rostrum), 8.3, 7.9, 8.3, 8.3, 8.0, 7.9; palatilar length (exclusive of palatal spine), 23.3, 21.4, 23.8, 23.8, 23.2, 22.0. In each instance, the measurement for the type specimen is given first.

*Remarks.*—*T. b. rufidulus* resembles most closely in morphological features *T. b. aureus* and *T. b. fulvus*. However, *rufidulus* is readily distinguishable from these two. This subspecies has a position somewhat intermediate between the pale-colored "aureus" gophers of northeastern Arizona and the dark-colored "fulvus" gophers of

the Mogollon Plateau. In his revision of the pocket gophers of Arizona, Goldman (North Amer. Fauna 59: 14, 1947) was unaware that such a race might exist.

The name *rufidulus*, meaning somewhat reddish or a little reddish, is in allusion to both the Little Colorado (= reddish) River and to the somewhat reddish coloration of the gophers.

*Specimens examined.*—**Arizona:** Navajo County: 2 miles east of Joseph City, 8 (Univ. Illinois, Mus. Nat. Hist.). Apache County: Navajo, 1 (Univ. Illinois, Mus. Nat. Hist.). **New Mexico:** McKinley County: Gallup, 2 (U. S. Biol. Surv. Coll.).

#### STATUS OF *Thomomys latirostris* MERRIAM

In 1901, Merriam described the pocket gopher *Thomomys latirostris* from Little Colorado River, Painted Desert, Ariz. (Proc. Biol. Soc. Washington 14: 107, 1901). In 1947, Goldman restricted the type locality to Tanner Crossing, about 3 miles above Cameron (North Amer. Fauna 59: 11, 1947). Merriam had but a single specimen from the Painted Desert, and the skull of this animal was unique in having an exceedingly broad rostrum. Attempts by Goldman to obtain additional specimens from the vicinity of the type locality proved unsuccessful, and he regarded the skull of the type as abnormal, calling Merriam's *latirostris* an aberrant individual of the race *Thomomys bottae aureus*. During the past few years, we have been successful in catching three gophers near Cameron. These specimens indicate that the gophers from near Cameron are quite distinct from other races of *T. bottae*, and gophers from along the western edge of the Painted Desert may differ in the same way. However these specimens do indicate that the rostrum of the type specimen is atypical. This gopher may be characterized as follows:

#### *Thomomys bottae latirostris* Merriam

*Type.*—Adult male, no. 18003/24914, U. S. Biol. Surv. Coll., from Little Colorado River, Painted Desert (= Tanner Crossing), Coconino County, Ariz.; collected September 22, 1899, by C. H. Merriam and V. Bailey, original no. 504.

*Range.*—Known only from Tanner Crossing and 4½ to 5 miles north of Cameron, Ariz.; probably in much of the Painted Desert.

*Diagnosis.*—A race of *Thomomys bottae* characterized by pale coloration and small size. Color on back and sides near (e) Orange-Buff or Pale

Yellow-Orange; tail and feet whitish; underparts whitish, with plumbeous underfur showing. Size small; smaller than typical *T. b. aureus*; rostrum long and broad (but condition in type specimen is atypical), relatively larger than that of *T. b. aureus*.

*Comparisons.*—*Thomomys bottae latirostris* needs close comparison only with *T. b. aureus*, from which it differs in paler color (Pale Yellow-Orange rather than Cinnamon-Buff) and in a smaller skull with a relatively broader rostrum.

*Measurements.*—Three males, two adults and one subadult, from 4½ to 5 miles N Cameron give the following respective measurements: total length, 212, 226, 206; tail, 61, 74, 60; hind foot, 32, 30, 30; ear, 5, 5, 5; basilar length, 33.0, 32.7, 31.7; zygomatic breadth, 23.1, 23.3, 20.9; mastoidal breadth, 19.7, 19.7, 19.6; length of nasals, 15.1, 12.6, 12.7; least interorbital breadth, 7.1, 6.6, 6.9; length of diastema, 12.9, 12.6, 11.2; length of rostrum, 17.3, 15.4, 15.4; breadth of

rostrum, 8.6, 8.1, 8.2; palatilar length (exclusive of palatal spine), 21.2, 21.0, 20.5.

*Remarks.*—Goldman (*op. cit.*) considers the type locality of Tanner Crossing as about three miles above Cameron. However, Barnes in his *Arizona place names* (Univ. Arizona Bull. 6: 437, 1935) says this crossing of the Little Colorado was near the Cameron bridge, and thus at Cameron itself.

One specimen (no. 161183, U. S. Biol. Surv. Coll.) from Tuba City, Coconino County, Ariz., closely approaches specimens of *latirostris* from near Cameron. Additional material from Tuba City may indicate that specimens from there are referable to *T. b. latirostris*.

*Specimens examined.*—**Arizona:** *Coconino County:* 5 miles north of Cameron, 1 (Univ. Illinois, Mus. Nat. Hist.); 4½ miles north of Cameron, 2 (Univ. Illinois, Mus. Nat. Hist.); Little Colorado River, Painted Desert, 1 (type, U. S. Biol. Surv. Coll.).

**MALACOLOGY.**—*Shell structure of West American Pelecypoda.* JOHN J. OBERLING,<sup>1</sup> University of California. (Communicated by Harald A. Rehder.)

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From an examination of numerous specimens from the major pelecypod families, it appears that the shells are composed of two types of deposits. One is secreted by the general surface of the mantle and is here termed palliostracum; the other is secreted over the muscle attachment areas and is here termed myostracum.

The palliostracum is composed, in addition to the periostracum, of three major layers, the ectostracum, mesostracum, and endostracum (Fig. 1). The ectostracum forms the outer surface of the shell, including the margins. The mesostracum emerges on the inner surface outside the pallial line

and includes the hinge. The endostracum forms the inner surface within the pallial line. A seemingly two-layered shell may result from combination of the outer two (mesectostracum) or inner two (mesendostracum) major layers. Sometimes all three layers are structurally identical, as in *Lyropecten*.

The myostracum is divisible into several components, the most important of which are: the pallial myostracum, a thin deposit secreted at the pallial line and the adductor myostraca, similar deposits secreted in the scars of the adductor muscles. Additional myostracal deposits are formed in the scars of lesser muscles, such as the retractor pedis.

The terms hypostracum and ostracum, hitherto employed in the nomenclature of the shell layers of pelecypods, have been discarded, for they refer to a "two-layered shell." Moreover, although Thiele (1903), the originator of the terms generally used the term hypostracum for the "inner layer" and ostracum for the "outer layer," subsequent authors (Jameson, 1912; Coker et al.,

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